

What is claimed is:

1. A frequency response for enhancing the quality of an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing, said frequency response comprising a curve with a shape, wherein the input audio signal becomes an enhanced audio signal when distorted in accordance with the shape of said curve, the input audio signal is distorted in accordance with the shape of said curve when signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies, and the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal.
2. The frequency response as set forth in claim 1, wherein the input audio signal is distorted in accordance with the shape of said curve when signal components having frequencies between the reference frequency and the high end increase in amplitude up to a significant amplitude peak and there is up to a total of only three significant amplitude peaks between the low end and the high end.
3. An apparatus for enhancing the quality of an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing, said apparatus being operatively adapted for distorting the input audio signal according to a frequency response curve such that, when the input audio signal is transmitted through said apparatus, said input audio signal is distorted into an enhanced audio signal such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies,

wherein said frequency response curve does not vary according to the amplitude of the input audio signal, and the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the input audio signal.

4. An apparatus for enhancing the quality of an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being in the range of normal human hearing, said apparatus being operatively adapted for distorting the input audio signal, when transmitted therethrough, into an enhanced audio signal such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies,

wherein the enhanced audio signal is recognizable as being an enhanced version of the input audio signal, and said apparatus enhances the input audio signal such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal, with said apparatus creating an impulse response that unmasks typically masked tones of the input audio signal by stretching the tone in the time domain long enough to be heard but not so long as to be blurred.

5. The apparatus as set forth in claim 4, wherein said apparatus stretches the tone to at least about 0.1 milliseconds in duration.

6. The apparatus as set forth in claim 4, wherein said apparatus provides an amplitude shaping function that overcomes both the pitch-loudness phenomenon and the suppression phenomenon by possessing the impulse response characteristics of a relatively long lasting impulse response and an impulse response with a wide-band characteristic.

7. A method of enhancing the quality of an audio signal, comprising:

providing an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing; and

distorting the input audio signal into an enhanced audio signal such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies, such that the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal;

wherein the enhanced audio signal is not normalized to a flat frequency response.

8. The method as set forth in claim 4, wherein said method further comprises processing the enhanced audio signal into sound and the enhanced audio signal is not normalized to a flat frequency response before being processed into sound.

9. The method as set forth in claim 4, wherein said step of distorting includes further distorting the input audio signal such that the signal components having frequencies between the reference frequency and the high end increase in amplitude up to a significant amplitude peak and there is up to a total of only three significant amplitude peaks between the low end and the high end.

10. A method of enhancing the quality of an audio signal, comprising:

providing an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing;

distorting the input audio signal into an enhanced audio signal such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies, such that the enhanced audio signal is

recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal; and

compressing the enhanced audio signal.

11. The method as set forth in claim 10, wherein the input audio signal is a digital audio signal, and the enhanced audio signal is compressed before being transmitted to a location.

12. The method as set forth in claim 10, wherein the input audio signal is a digital audio signal, and the enhanced audio signal is compressed before being converted into sound.

13. A method of enhancing the quality of an audio signal, comprising:

providing an input audio signal made up of a plurality of signal components, each signal component having an amplitude and a frequency, and the frequencies of the input audio signal being within a band of frequencies having a low end and a high end, at least a portion of which being within the range of normal human hearing;

distorting the input audio signal into an enhanced audio signal, according to a frequency response curve having a width, such that signal components having frequencies between a reference frequency and the high end increase in amplitude as per increasing frequencies from the reference frequency toward the high end, over at least a portion of the band of frequencies, such that the enhanced audio signal is recognizable as being the input audio signal enhanced such that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality and sound source separation compared to audible sound reproduced from the undistorted input audio signal;

processing the input audio signal through an audio system having a bandwidth; and  
reducing the width of the frequency response curve so as to fit at least mostly within the bandwidth of the audio system.

14. The method as set forth in claim 13, wherein the input audio signal is processed through the audio system before being distorted into an enhanced audio signal.

15. The method as set forth in claim 13, wherein the input audio signal is distorted into an

enhanced audio signal before being processed through the audio system.

16. The method as set forth in claim 13, wherein said step of distorting includes further distorting the input audio signal such that the signal components having frequencies between the reference frequency and the high end increase in amplitude up to a significant amplitude peak and there is up to a total of only three significant amplitude peaks between the low end and the high end.

17. The method as set forth in claim 16, wherein the reduction of the width of the frequency response curve so as to fit at least mostly within the bandwidth of the audio system is accomplished by reducing the reference frequency and the frequencies of the significant amplitude peaks proportionally the same.

18. The method as set forth in claim 16, wherein the reduction of the width of the frequency response curve so as to fit at least mostly within the bandwidth of the audio system is accomplished by reducing one or more of the reference frequency and the frequencies of the significant amplitude peaks disproportionately.